

## NEW SIPHONAPTERA.

By DR. KARL JORDAN.

(With 22 text-figures.)

**Delopsylla** gen. nov.

Near *Moeopsylla* Roths. (1908), but differs considerably in the epipharynx and mandibles being slender, the metanotum much shorter than the mesonotum and devoid of a row of bristles, the mesepisternum oblique, the mesothoracical stigma placed close to the coxa as in *Echidnophaga*, the fifth tarsal segment bearing five large plantar bristles, etc.

Frontal tubercle not quite so far dorsal as in *Moeopsylla*. Ventral genal lobe long. Mandibles and epipharynx slender, their teeth small; labial palpus membranous, segmentation indistinct. Mesonotum as long as pronotum, metanotum much shorter. Antepygidial bristles strong, one in ♂, two to four in ♀. Anterior margin of pygidium dorsally not much raised. Hindcoxa with apical tooth anteriorly; bristles of tarsi and dorsal and apical ones of tibiae strong, as are the five lateral bristles of tarsal segment V.

♂. Tergite IX without manubrium above that of clasper; the two lower processes of clasper as in *Echidnophaga* a pair of pincers (text-fig. 1).

♀. Head of spermatheca small, tail long and curved, orifice subdorsal (text-fig. 2).

Genotype: *D. crassipes* sp. nov.

1. **Delopsylla crassipes** sp. nov.

♂♀. Frons with two large bristles, occiput with one; bristles of second segment of antenna and one bristle of first long; proboscis reaching about to two-thirds of forecoxa; the labial palpus apparently divided by one joint into a short basal segment and a long apical one. Pro- and mesonotum with a row of bristles, consisting on each side of four to six large lateral ones and two or three small dorsal bristles; on mesopleura two, on metepisternum one bristle, on metepimerum two or three rows, containing in ♂ usually eleven, sometimes ten, in ♀ from twelve to seventeen bristles. On tergite I on each side two or three bristles, on II to VI one, on VII two or three, on sternites II to VI no bristles, on VII one or two. Hindtibia with at least thirteen stout dorsal bristles exclusive of apical ones, and no lateral bristles; the two longest apical bristles reaching beyond apex of tarsal segment I, one or two of I beyond II, and one or two of II to or beyond middle of V.

♂. Upper process P<sup>1</sup> of clasper more than twice as long as second (text-fig. 1), straight, of nearly even width, about four times as long as broad, dorsal margin hairy, on outer surface about six to eight slightly longer bristles, at apex a straight, cylindrical, obtuse spine. On each side of sternite VIII three or four bristles.

♀. On outer surface of ventral area of tergite VIII five or six large bristles and one to three small ones, at apical margin ten or eleven bristles, of which

two or three are short. Head of spermatheca (text-fig. 2) as broad as long, tail twice as long and rather less than half as wide as head.

Length (mounted specimens): ♂ 1.7-1.9 mm., ♀ 2.7-3.1 mm.

*Hab.* Kenya Colony: Nairobi, off *Pedetes surdaster larvalis*, March 1925 (Dr. V. G. L. van Someren), a small series.

## 2. *Ceratophyllus gallinulae perpinnatus* Baker (1904).

The North American specimens of this species which we have so far treated as identical with European ones are in reality distinguished by some details in

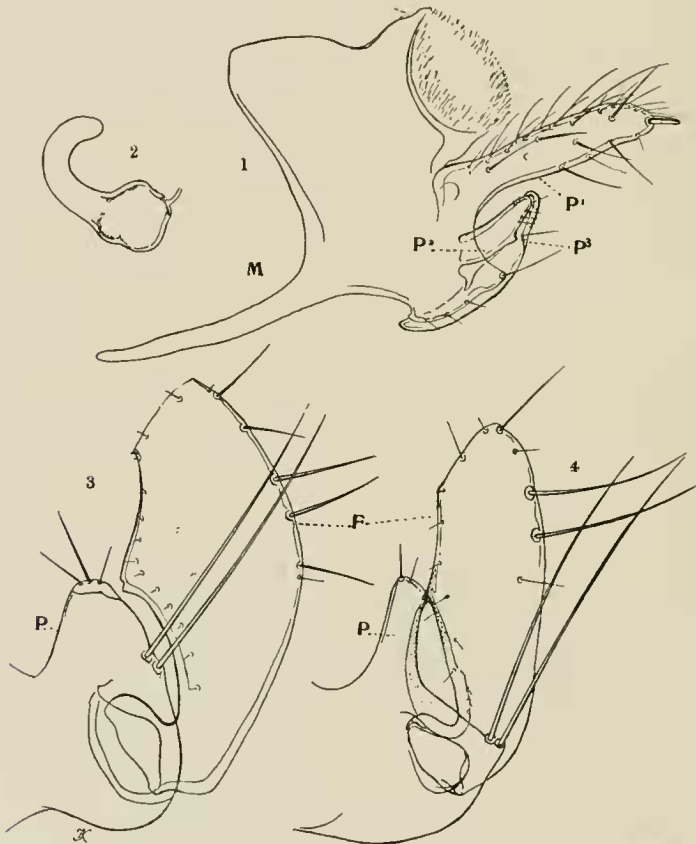


FIG. 1.—*Delopsylla crassipes* ♂. FIG. 3.—*Ceratophyllus vagabunda alpestris* ♂.  
 " 2. " " ♀. " 4. " " *celsus* ♂.

the tail-ends. For instance, in the ♂ the process P of the clasper is hardly at all incurved on the posterior side and the exopodite F has the apical margin less slanting and therefore the anterior apical angle less acute, and in the ♀ the sinus of sternite VII is smaller and the lobe above it broader and always rounded. The name *perpinnatus* Baker 1904, based on Nearctic specimens, must be revived. We have now a good series of this subspecies.

## 3. *Ceratophyllus vagabunda* Boh. (1866).

The study of further material proves the species to vary geographically.

(a) *C. vagabunda vagabunda* Boh. (1866).

The Arctic subspecies, of which Dr. A. Dampf has given beautiful figures in 1911 (in König, *Avifauna Spitzbergensis*).

(b) *C. vagabunda insularis* Roths. (1906).

The British subspecies. Distal portion of sternite IX of ♂ much narrower than in Arctic specimens.

(c) *C. vagabunda alpestris* subsp. nov.

*Ceratophyllus vagabunda* Boh., J. & R., *Ectoparasites*, i. p. 85, no. 12 (1920) (above Zermatt).

♂. Exopodite F (text-fig. 3) much shorter and broader than in the previous races, more curved and its bristles stouter. Distal portion of sternite IX as narrow as in *C. v. insularis*. Apical fringed lobe of sternite VIII small, the dorsal prolongation spine-like (variable in length) and without fringes, or with hardly any. As in *C. v. insularis*, P of clasper broader and the pair of acetabular bristles placed farther upwards than in *C. v. vagabunda*.

♀. Below stigma of tergite VIII three to six bristles (usually three or four), of which two or three are long; on the ventral outer area of this segment from fifteen to twenty bristles. Head of spermatheca (measured in a straight line) a little shorter than the first midtarsal segment.

*Hab.* Switzerland: Findelen, above Zermatt, in nest of *Pyrrhocorax graculus*, a series.

4. *Ceratophyllus celsus* spec. nov.

♂. Allied to *C. diffinis* Jord. (1925), but distinguished from all the allied bird-fleas by the long and narrow process P of the clasper (text-fig. 4). Comb a little longer than the pronotum, measured in middle of side. Abdominal tergites I, II and III with two apical spines each side, IV two on one side and one on the other; basal sternite with two ventral bristles on the two sides together (no lateral ones), III and IV with five, V with four, VI with six and a small one in front, VII with four and three small ones. On outer surface of hind-femur two bristles, besides a third towards base and a fourth towards apex, these latter two subventral. On outer surface of hindtibia a single lateral subdorsal row, containing nine bristles, not counting the small bristle at apex. None of the hindtarsal bristles reach the apex of the segment following; on outer surface of segment I of hindtarsus five bristles in one tarsus and seven in the other, apart from the lateral and apical bristles; on sole of segment V very few minute hairs. Tergite VIII not unlike that of *C. niger* Fox (1908); it bears nine or ten bristles at and near the dorsal margin, two or three towards base and one long one near ventral margin. Process P of clasper about four times as long as it is broad in middle; posterior margin of clasper straight and slanting between P and the acetabular bristles, forming a right angle with the ventral margin, the two bristles placed just above this angle, being subventral; exopodite F of the same type as in *C. niger*, somewhat longer and bearing on the posterior side in apical half two rather strong bristles, between them and apex two small ones, of which the apical one is the longer, and below the strong bristles one small slender one. Dilated portion of proximal half of ninth sternite longer and narrower, i.e. less strongly rounded than in *C. niger*. Sternite VIII with

seven long bristles at apex (on the two sides together), and two spiniform membranous projections which are directed distad, each preceded by a small membranous lobe, which does not seem to be fully expanded in the only specimen before me.

*Hab.* British Columbia; Okanagan Falls, April 1913, off *Riparia riparia* (C. Garrett), one ♂.

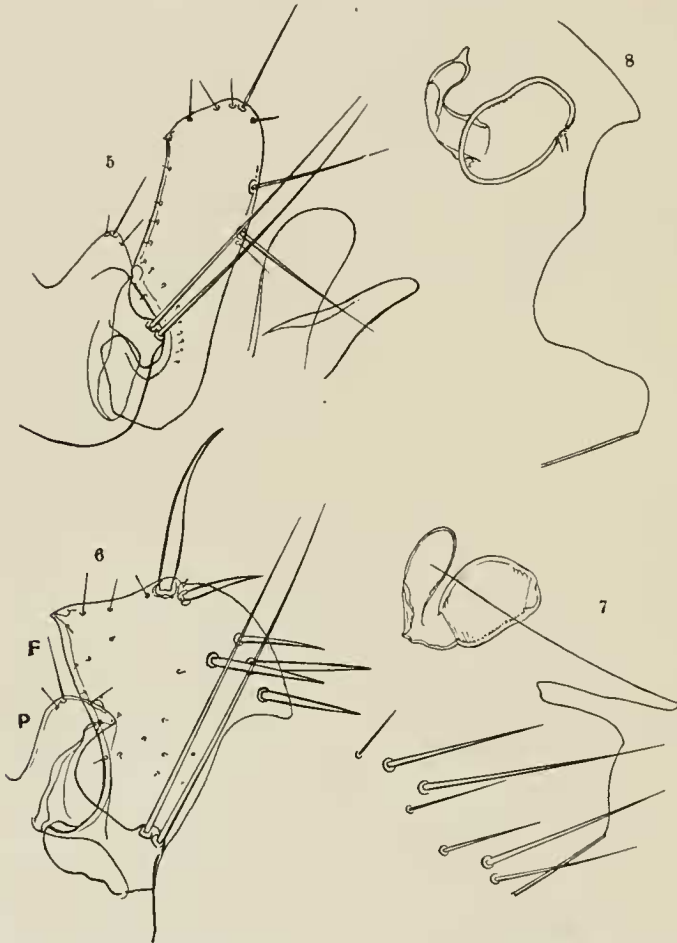


FIG. 5.—*Ceratophyllus tribulis* ♂.  
 „ 6. „ *borneensis* ♂.

FIG. 7.—*Ceratophyllus borneensis* ♀.  
 „ 8.—*Stivalius mjobergi* ♀.

### 5. *Ceratophyllus tribulis* sp. nov.

♂. Similar to *C. gallinae* Schrank (1803), which it probably represents in Central Asia: bristles of exopodite thinner (text-fig. 5), the two lower ones, below which there is a small bristle, placed farther down, the short, spiniform, third bristle farther up, the apical one at least as stout as the second; paramere broader. Differs from *C. pullatus* J. & R. (1920) in the denticulated dorsal area of tergite VIII being as wide as in *C. gallinae*, and in the paramere and the distal portion of sternite IX being broader.

*Hab.* E. Turkestan: Narankol and Djarkent, off *Gallus domesticus* (W. Rückbeil), two ♂♂.

#### 6. *Ceratophyllus borneensis* sp. nov.

Near *C. agathus* J. & R., *Ectoparasites*, i. p. 225, no. 6, text-fig. 219 (1922), from Sumatra.

♂. Seventh tergite with short dorsal median process. Eighth tergite large, with a dorso-apical row of nine to eleven long bristles, seven to nine lateral bristles, and two long ventral ones (in type accompanied by a short one). Eighth sternite on each side with a bristle, proximally of which the segment is divided into a right and a left lobe, the lobes ovate-lanceolate, distally membranaceous, entire, not fringed; proximally the segment with a short narrow vertical projection. Manubrium of elasper without hump on dorsal margin; process P (text-fig. 6) narrow, apically dilated on the posterior side into a nose; exopodite broadest distally, recalling *C. levis* J. & R., *Ectoparasites* i. p. 219, no. 3, text-fig. 213 (1922), from the Malay peninsula, but its distal margin not incurved between the two sets of bristles, bearing six heavy bristles, of which two are dorsal and four subventral. Apical portion of sternite IX much broader than in *C. levis*, with a lateral row of longish slender bristles and distally with numerous small ones.

♀. Sternite VII deeply sinuate, the upper lobe narrow and projecting much more than the ventral lobe (text-fig. 7).

Length. ♂ 2.1-2.2, ♀ 2.3 mm.

*Hab.* Borneo: Mt. Murud, Oct. 1922 (Dr. E. Mjöberg), two ♂♂, one ♀ on *Sciurus jentinki*.

#### 7. *Stivalius mjobergi* sp. nov.

♀. Abdomen with two combs, the spines of which are similar to those of the prothoracic comb, but somewhat smaller, the first abdominal comb containing sixteen spines, the second eight. In *S. jacobsoni* J. & R. (1922), from Sumatra, the abdomen bears only one comb. Lobe above the sinus of sternite VII (text-fig. 8) acuminate, the ventral lobe rounded. Spermatheca recalling that of *S. synetus* J. & R. (1922), its head being widest near the tail.

Length (of distended mounted specimen) 4.3 mm.

*Hab.* Borneo: Mt. Murud, off *Tupaia montana* (Dr. E. Mjöberg), one ♀.

#### 8. *Stivalius rhaebus* sp. nov.

♂. Related to *S. robinsoni* Roths. (1905). Spinose process of sternite VIII (below sternite IX) much shorter. Exopodite F (text-fig. 9) much more strongly curved, bearing a row of three large bristles close to apex. Distal portion of ventral arm of sternite IX less curved than in *S. robinsoni*, with a dorso-apical tooth and a subapical lateral flap which bears small marginal bristles, above this flap, on inside, a patch of small hairs; at ventral margin at some distance from apex a row of five short blunt spines and proximally of them some small hairs and two strong curved bristles.

♀. Sinus of sternite VII (text-fig. 10) larger than in *S. robinsoni*; head of spermatheca narrower; as in *S. robinsoni* tergite VIII proximally with an

incrassation which in the main is tripartite, one branch extending upwards, a second downwards, and a third distad.

*Hab.* Borneo: Mt. Dulit, off *Sciurus brooksi* (Dr. E. Mjöberg), one pair, type ♂.

More detailed descriptions and figures of the preceding three species were sent to Sarawak in 1923, but do not seem to have as yet been published. As I have to refer to these species in the course of my researches in Siphonaptera the publication of the present preliminary descriptions is a necessity to me.

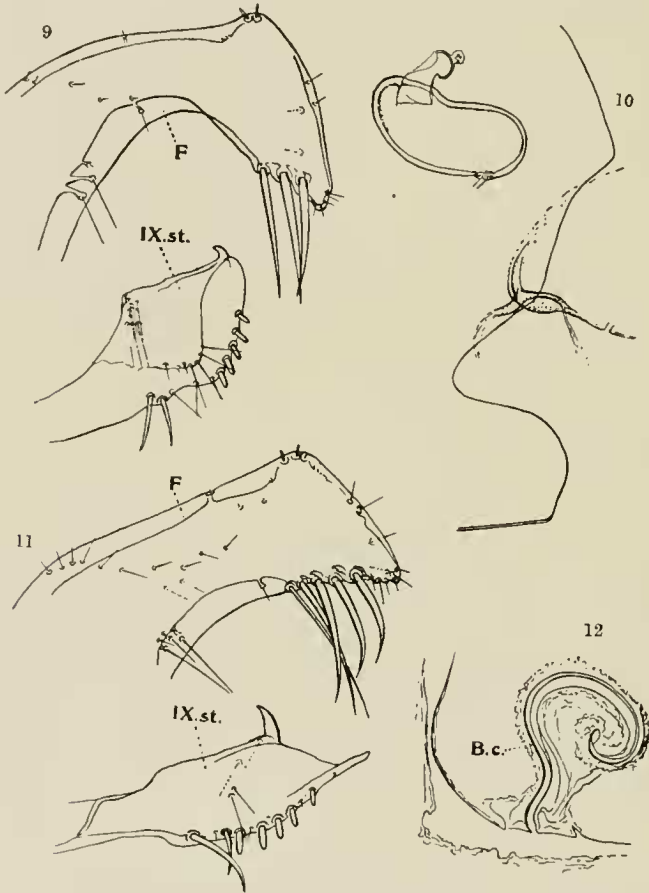


FIG. 9.—*Stivalius rhaebus* ♂.  
,, 10. ,, ,, ♀.

FIG. 11.—*Stivalius lonchus* ♂.  
,, 12. ,, *spiramus* ♀.

### 9. *Stivalius lonchus* sp. nov.

♂. Likewise related to *S. robinsoni*. The spiniform bristles of the ventral process of sternite VIII much longer. Exopodite F (text-fig. 11) not essentially different, but sternite IX peculiar, ending with a short straight process and bearing a prominent dorsal hook.

*Hab.* Borneo: Mt. Poi, 5,000 ft., Oct. 1923, from *Tupaia* spec. (Dr. E. Mjöberg), one ♂.



10. *Stivalius spiramus* sp. nov.

♀. Bristles as in *S. robinsoni*, but more numerous, particularly on the abdomen: in front of the postmedian row forty-one smaller bristles on tergite II on the two sides together, on III forty, on VI thirty-six, on VII thirty-three, on basal sternite on one side twenty, on the other nineteen small lateral bristles, sternite VII with a row of eleven large bristles and fifty-three small ones on the two sides together. Anal sternite proximally more convex than in *S. robinsoni* ♀, the bristles on this basal portion more numerous than in that species. Sternite VII almost as in *S. rhaebus* (text-fig. 10), the upper angle more rounded. Tergite VIII without the incrassation of *S. robinsoni* and *S. rhaebus*; the upper (= posterior) wall of the oviduct more strongly chitinised than usually; bursa copulatrix (text-fig. 12, B.c.) long and involute, quite different from that of the allied species.

*Hab.* Philippines: Baguio Bengue, viii.1923, from *Rattus quereci* (E. H. Taylor), one ♀.

11. *Stenopsylla intermedia* Wagn. (1901).

The examination of further material proves that we were wrong when we stated in *Ectoparasites*, i. p. 25 (1915), that this species "does not appear to be split up into geographical varieties." The specimens before me represent four subspecies, distinguished by differences in the tail-ends, at least in the ♂♂.

(a) *S. intermedia intermedia* Wagn. (1901).

*Syn.*: *Stenopsylla cruzi* Cunha, 1914 (Brazil).

♂. The apical margin of the clasper distinctly incurved at some distance from the deep sinus which separates the dorsal, bristle-bearing, process P<sup>1</sup> from the body of the clasper, a short second process P<sup>2</sup> being formed, which is broad and rounded.

♀. The lobe above the sinus of sternite VII long, the proximal outline of the internal incrassation almost semicircular, the bristles of VII st. stout, the upper one nearly always vertically above the subapical pair.

*Hab.* S.E. Brazil and Paraguay; from *Didelphys azarae*, *Marmosa cinerea*, *Chironectes minimus*, *Metachirus opossum* and *M. nudicaudata*. A series.

(b) *S. intermedia oxyura* subsp. nov.

♂. Process P<sup>2</sup> of clasper (text-fig. 13) narrower than in the previous form and longer.

♀. As in *S. i. intermedia*, the upper lobe of sternite VII long (text-fig. 14) and mostly rather narrower than in the previous form.

*Hab.* Venezuela: S. Esteban (S. M. Klages); on *Didelphys marsupialis*, *Marmosa cinerea* and *M. murina*. A series.

(c) *S. intermedia coph*a subsp. nov.

♂. Apical margin of clasper very slightly or not at all incurved, the angle of P<sup>2</sup> not projecting as a separate process (text-fig. 15).

♀. Sternite VII less deeply sinuate than in the previous forms, the lobe above the sinus shorter and more obtuse; the upper bristle of this sternite more proximal

than the subapical pair, the proximal outline of the incrassation oblique (text-fig. 16).

*Hab.* Panama : Boquete (J. H. Batty), off *Didelphys* "azaræ" (probably = *D. marsupialis etensis*), type ; Colombia : Pacho (Rev. P. Apollinaire-Marie), off *D. marsupialis* ; Ecuador : Paramba (W. F. H. Rosenberg), from *D.* "azaræ." A series.

(d) *D. intermedia vidua* subsp. nov.

♀. The sinus of sternite VII (text-fig. 17) very shallow, the incrassation weak, the upper bristle far in front of the subapical pair and thin.

*Hab.* Mexico : Misantla, off *Didelphys*, one ♂.

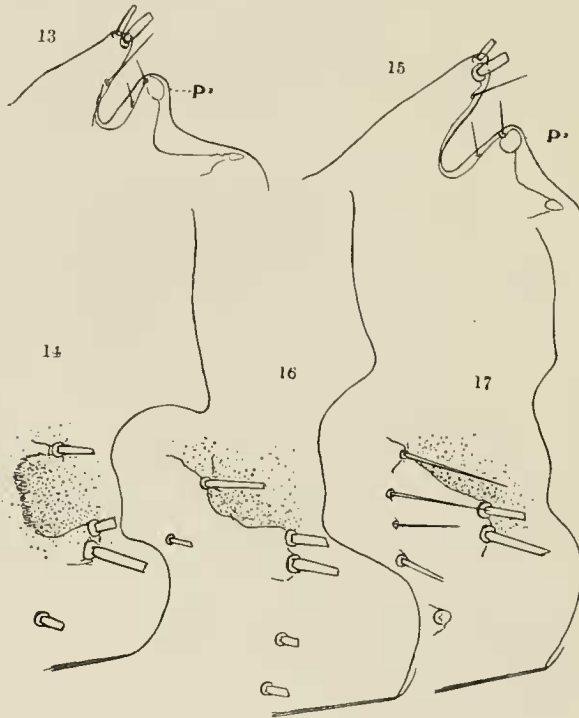


FIG. 13.—*Doratopsylla intermedia oxyura* ♂.  
 .. 14.     "     "     "     "     ♀.  
 .. 15.     "     "     "     *copha* ♂.  
 .. 16.     "     "     "     "     ♀.  
 .. 17.     "     "     "     *vidua* ♂.

12. *Doratopsylla antiquorum discreta* subsp. nov.

♂. Differs from *D. a. antiquorum* Roths. (1904, S.E. Brazil) in the lower antepygidial bristle being nearly as long as the upper, though thinner, and in the shape of the elasper : the nose of the posterior side of P (text-fig. 18) is placed about halfway between the lower apical bristle and the base of the exopodite F, the corresponding angle and pan of F being moved upwards to one-third of the proximal margin of F ; the apical bristles of P farther apart than in Brazilian examples (*D. a. antiquorum*).

*Hab.* Colombia : Cundinamarca, off *Peromyscus adustus*, two ♂♂.



13. *Ctenophthalmus agyrtes graecus* subsp. nov.

♂. Similar to *Ct. agyrtes provincialis* Roths. (1910), but process P<sup>2</sup> of clasper (text-fig. 19) shorter, the exopodite, therefore, projecting much more than in *provincialis*, apex of ninth sternite more rounded.

♀. Like that sex of *provincialis*.

*Hab.* Greece: Pelion, Thessaly, vi. 1922, found in rotten wood (E. Moczarski), two pairs.

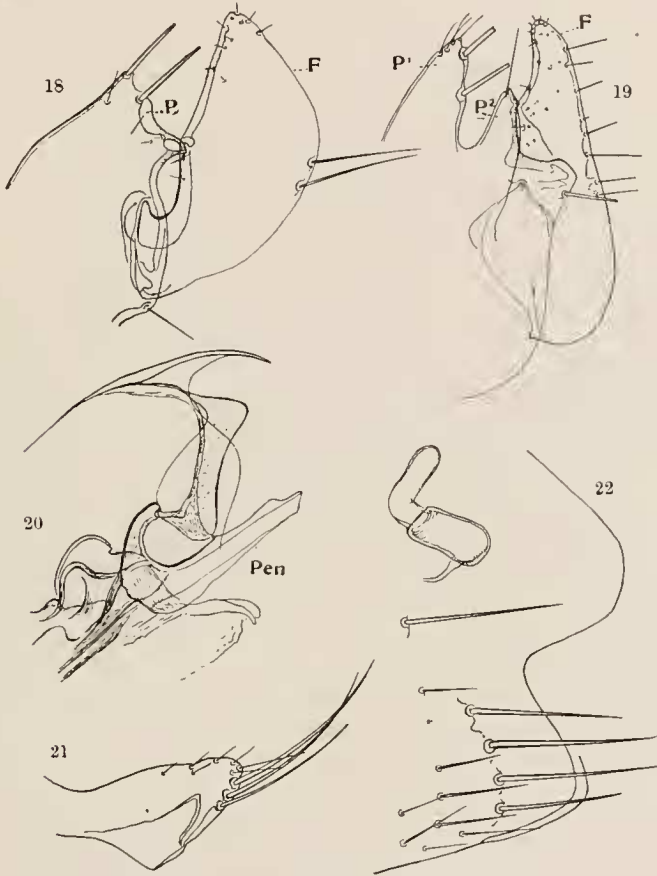


FIG. 18.—*Doratopsylla antiquorum discreta* ♂.  
 ,, 19.—*Ctenophthalmus agyrtes graecus* ♂.  
 ,, 20. ,, *moratus* ♂.  
 ,, 21. ,, ,, ♂.  
 ,, 22. ,, ,, ♀.

14. *Ctenophthalmus moratus* spec. nov.

Belongs to group II of our Key published in NOVITATES ZOOLOGICAE, xx. p. 560 (1913), being related to *Ct. cabirus*, *Ct. atomus*, etc. Both sexes are easily recognised by the tail-ends. In the ♂ the eighth sternite is very large, the ventral arm of the ninth sternite very short, and the penis is armed with a long dorsal apical sickle-shaped hook. The ♀ agrees with *Ch. cophurus* in the distal

bristles of the eighth tergite being placed at some distance from the margin, but differs from that species in the mesonotum bearing more than two rows of bristles, in the spermatheca being smaller, and the seventh sternite resembling that of *Ct. cabirus*.

♂. Sternite VIII very large, apically almost evenly rounded, bearing ventrally on each side twelve to sixteen bristles. Process P of clasper about as long as broad, obliquely truncate, slightly sinuate, bearing four long bristles, besides some small ones: two at upper angle, the third below the small apical sinus, and the fourth ventral, placed about as far from the ventral apical angle of P as the third bristle. Exopodite F more than twice as long as broad, the breadth measured from the nose of the anterior margin straight to the hindmargin, apical margin more or less strongly rounded from angle of anterior margin to posterior apical angle and bearing a row of nine to thirteen small bristles; there are several small bristles at the apical angle, the posterior margin slightly concave from apex to about middle, here angulate, below this angle three bristles (small, long, medium). Ventral arm of ninth sternite (text-fig. 21) rounded-triangular, a little longer than broad, bearing three long bristles, which are ventral, and seven or eight small ones. Armatures of parameres large (text-fig. 20), with a sharp dorsal apical hook each side, armature of duct ending with a well-chitinised horizontal tube (Pen), which is ventral and bears a small tooth dorsally near middle, between this tube and the dorsal hooks on each side a vertical sclerite, the posterior side of which is more or less incurved.

♀. Sternite VII deeply sinuate (text-fig. 22), the upper lobe broad and evenly rounded, the lower lobe short, broad, a subapical row of five long bristles on each side, the upper one far removed from the others, in the gap or near it a smaller bristle, ventrally on each side four to eight small ones in front of the row. On eighth tergite a subventral row containing six long and slender bristles and one or two smaller ones, above the row a long bristle and four to eight smaller ones, on each side of the body, the two distal bristles of the row equal in size or nearly and remote from the apical margin, on inside four to six small bristles. Head of spermatheca somewhat shorter than the tail.

Length ♂ 2.1-2.4 mm., ♀ 2.4-2.6 mm.

*Hab.* Gold Coast: Kumasi, off *Typomys trivirgatus*, discovered by Major C. M. Ingoldby, R.A.M.C., and kindly sent to us by Lt.-Col. W. P. MacArthur, R.A.M. College, London. A series.

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